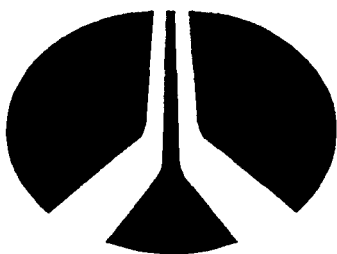


**INTERIM STATUS
CLOSURE PLAN
BENCH SCALE TREATMENT
UNIT 32**

**U.S. DEPARTMENT OF ENERGY
ROCKY FLATS PLANT
GOLDEN, COLORADO
OCTOBER 3, 1988**



Rockwell International

**Prepared for.
Rockwell International
Aerospace Operations
Rocky Flats Plant
P O. Box 464
Golden, Colorado 80402-0464**

**Prepared by.
Advanced Sciences, Incorporated
5600 South Quebec Street, Suite 307 D
Englewood, Colorado 80111**

ADMIN RECORD

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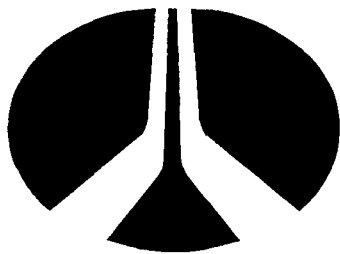
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By *[Signature]* **Date** 4/21/92

Volume XXII

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1.0
INTRODUCTION

1.0 INTRODUCTION

This interim status closure plan is being submitted for the decommissioning and decontamination of bench scale treatment unit 32 in compliance with Colorado Hazardous Waste Regulations under CHWR 264, Subpart G, Closure and Post-Closure, Section 264.178, Subpart I, Containers, and Federal regulations contained in CFR 265. This plan is in accordance with the Compliance Agreement between the Colorado Department of Health (CDH), the U.S. Environmental Protection Agency (EPA), and U.S. Department of Energy (DOE).

After closure the bench scale treatment unit will be deleted from the Rocky Flats Plant Resource Conservation and Recovery Act (RCRA) Part B Permit Application for low level and mixed waste, and this interim status closure plan will be appended to the Post-closure Care Permit.

1.1 ROCKY FLATS PLANT LOCATION, DESCRIPTION, MISSION, AND HISTORY

1.1.1 Location and Operator

The U.S. Department of Energy's Rocky Flats Plant is located in north-central Colorado, northwest of the City of Denver (Figure 1-1). The Plant is located in Sections 1 through 4 and 9 through 15 of T. 1 S., R. 70 W. The facility's EPA identification number is CO7890010526. The mailing address is:

U.S. Department of Energy
Rocky Flats Plant
P.O. Box 464
Golden Colorado 80402-0464

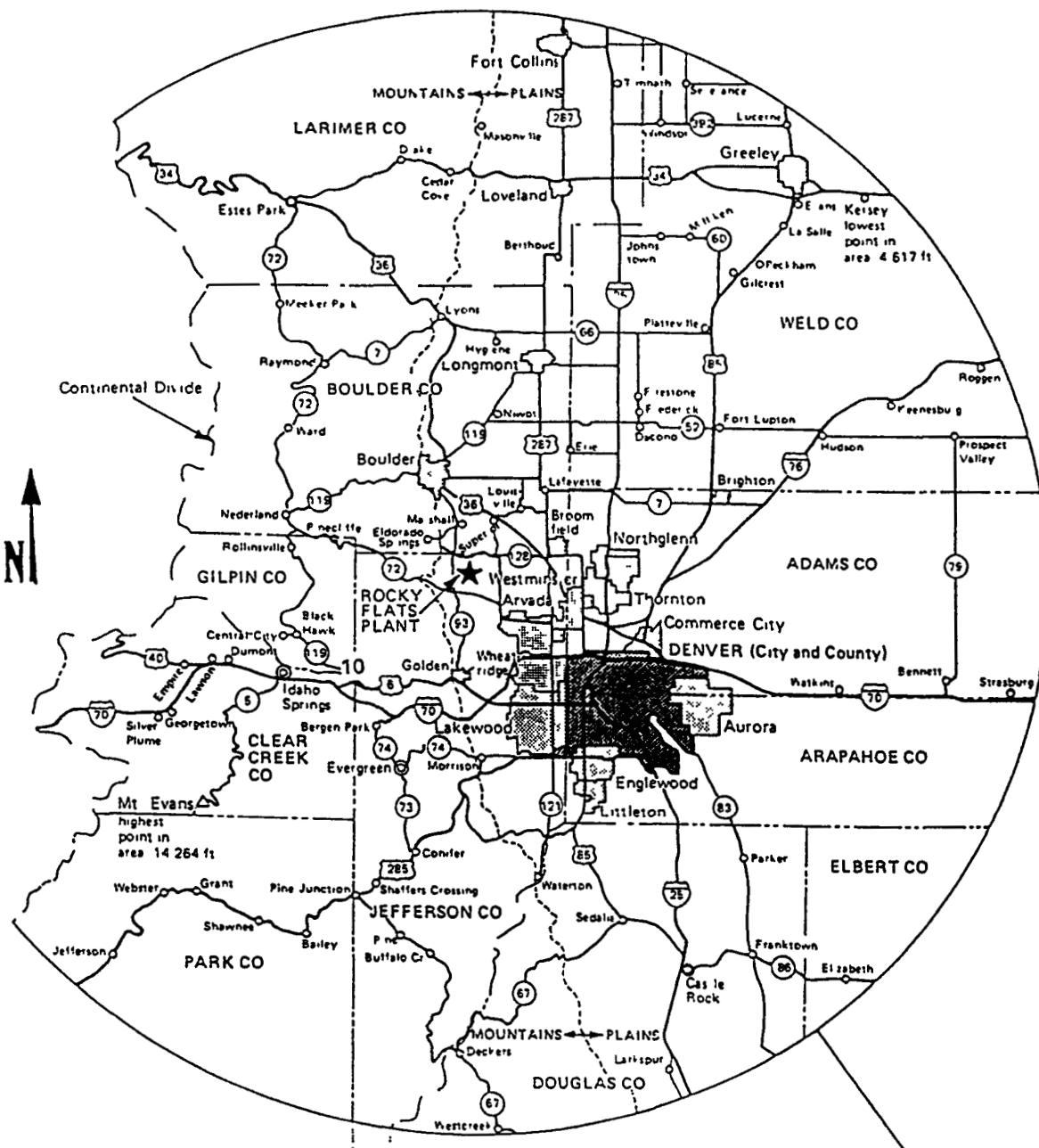
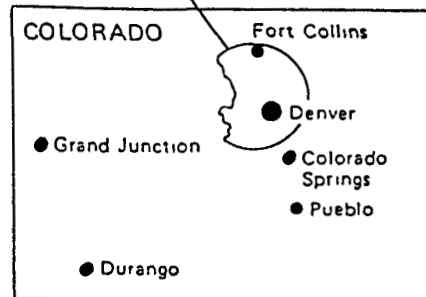


FIGURE 1-1
ROCKY FLATS
SITE VICINITY MAP



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The facility contact is:

Albert E. Whiteman, Area Manager
Phone: (303) 966-2025

The facility covers approximately 6,550 acres of federally owned land in northern Jefferson County, Colorado, which is centered at 105° 11' 30" west longitude, 39° 53' 30" north latitude.

Rocky Flats Plant occupies nearly 11 square miles of a geological bench, known locally as Rocky Flats. Rocky Flats is approximately 5 miles wide and flanks the eastern edge of the Rocky Mountain foothills. The Plant site (elevation 6000 feet) lies 16 miles northwest of Denver (elevation 5280 feet), with the nearest communities, 9 to 12 miles away, including Arvada, Broomfield, Boulder, and Golden. State Highway 128 follows the northern boundary and Jefferson County Highway 17 comprises the eastern boundary (Figure 1-1). Access to the Plant via an east access road (Off JCH-17) and a west access road (off CO-93).

Rocky Flats Plant was constructed in the 1950s and operated under the U.S. Atomic Energy Commission until 1975 when the Energy Research and Development Administration assumed responsibility for Plant operations. In 1977 the U.S. Department of Energy was created and assumed responsibility for Plant operations.

The original facility covered an area of approximately 2,520 acres. A buffer zone was added in 1974-1975 to enlarge the Plant to its present size of approximately 6,550 acres. The buffer zone had been used for grazing cattle and horses and is enclosed within a cattle fence which is posted with signs indicating restricted areas. Two office buildings, a warehouse, firebreaks, holding ponds along three watercourses, environmental monitoring

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restricted areas. Two office buildings, a warehouse, firebreaks, holding ponds along three watercourses, environmental monitoring instrumentation, a sanitary landfill area, a salvage yard, power lines, inactive gravel pits, clay pits, and two target ranges are located in the buffer zone. Additionally, a former wind energy test site now used as an office building and a Ground Wave Emergency Network (GWEN) tower being installed by the U.S. Air Force are located in the buffer zone. Major facility structures are located in a 400-acre controlled area near the center of the property. Production, research and development facilities at the Plant are located in the controlled area which contains approximately 134 structures with a combined floor space of approximately 2.67 million square feet.

From 1951 until June 1975, the prime operating contractor for the facility was Dow Chemical U.S.A., a unit of the Dow Chemical Company. Since June 1975 Rockwell International has been the prime operating contractor for Rocky Flats Plant (since June, 1975) under the general direction of the U.S. DOE, Albuquerque Operations Office. As a government-owned and contractor-operated facility, the Rocky Flats Plant comprises a portion of the nationwide nuclear weapons production complex.

The primary Plant Mission is to produce plutonium components for nuclear weapons. Plutonium, uranium, beryllium, and stainless steel parts are fabricated at the Plant and shipped off-site for final assembly. Additional activities include chemical processing to recover plutonium from scrap material, metallurgical research and development, machining, assembly, non-destructive testing, coatings, remote engineering, chemistry, and physics.

Waste handling operations at the Rocky Flats Plant include storage, transport, treatment, and packaging of waste materials generated on-site. The waste forms that are handled include hazardous chemical waste, radioactive waste, and non-hazardous, non-radioactive waste. A variety of containers and tanks are used to treat or store hazardous wastes. Aqueous cyanide solutions are stored and treated at the bench scale treatment unit.

1.2 DESCRIPTION OF BENCH SCALE TREATMENT UNIT 32

1.2.1 Introduction

A bench scale treatment process for the conversion of cyanide to cyanate occurs in the Building 881 laboratory on a regular basis. Samples generated in other laboratories are transferred to the fume hood for analysis of cyanide content using a cyanide still. Wastes from this analysis are collected in a four-liter polyethylene bottle in the same fume hood. When a bottle is full, which normally takes about two months, the contents are treated in the bottle with sodium or calcium hypochlorite to oxidize the cyanide to cyanate. A residual chlorine-specific ion electrode is used to determine when the conversion is complete. The neutralized contents of the bottle are then poured down the process waste drain for pipeline transport to Building 374 for further treatment.

Since cyanide is a listed hazardous waste, this waste treatment unit is regulated by RCRA. This closure plan addresses the steps needed to decontaminate and decommission the bench scale treatment unit.

1.2.2 Location of Unit

The bench scale treatment unit is in a laboratory in Room 131C in the southeast corner of the first floor of Building 881 (Figures 1-2, 1-3). This building is in the south-central part of the Rocky Flats Plant.

1.2.3 Unit Composition

The treatment unit consists of a 4-foot by 5-foot painted metal fume hood, three four-liter polyethylene bottles, a glass beaker, and a chlorine-specific ion electrode. The neutralized contents of the bottle are poured into a process waste drain for pipeline transport to Building 374 for further treatment. The drain and waste pipeline are not addressed in this closure plan because they will be used by the laboratory for RCRA regulated wastes after the treatment unit is decommissioned and because the material poured down the drain from this treatment unit is not regulated under RCRA.

1.2.4 Total Storage Capacity

The total storage capacity for cyanide-bearing wastes is eight liters. However, there is rarely more than four liters in storage because the stored wastes are neutralized as soon as one of the four-liter polyethylene bottles is filled (about every two months).

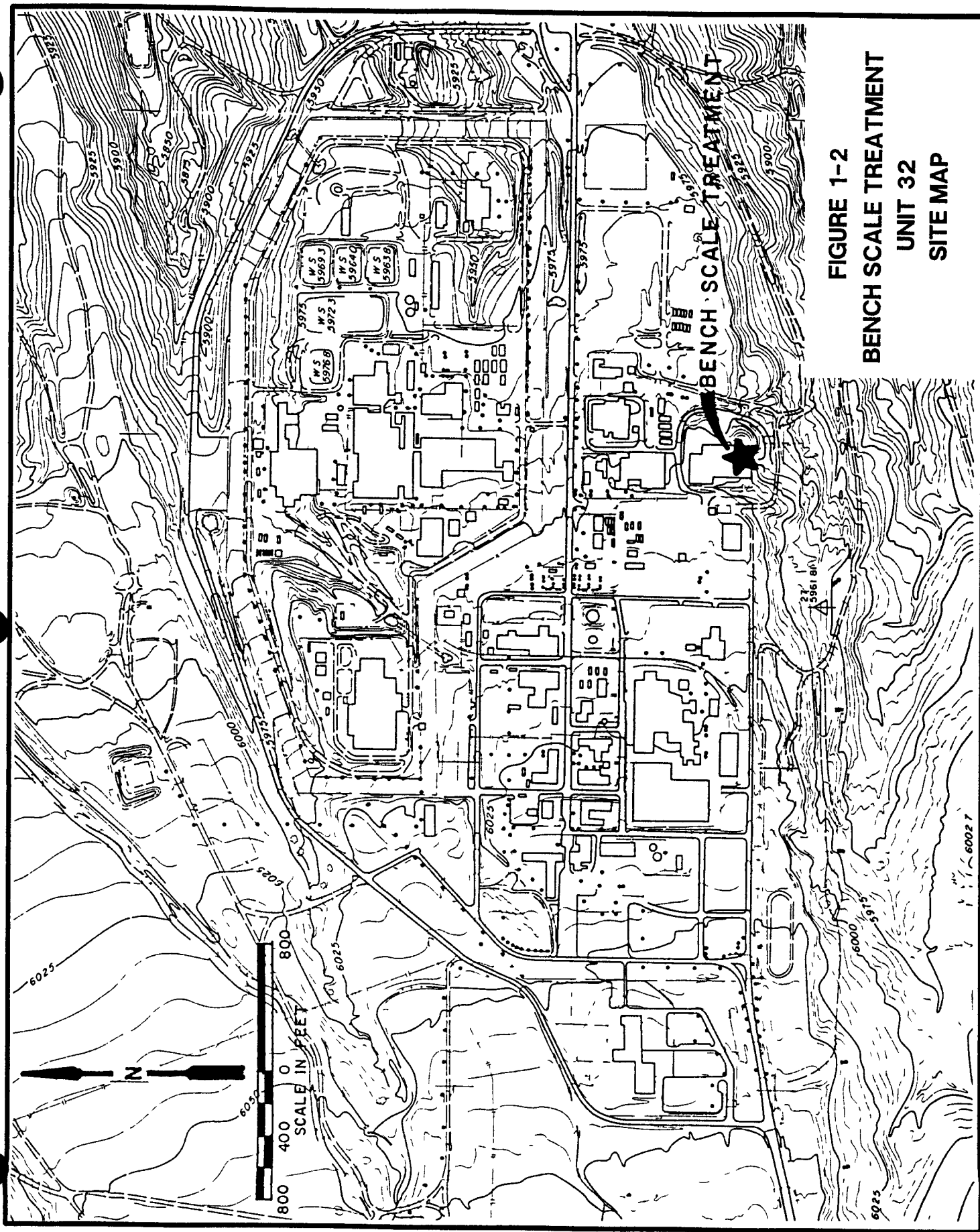


FIGURE 1-2
BENCH SCALE TREATMENT
UNIT 32
SITE MAP

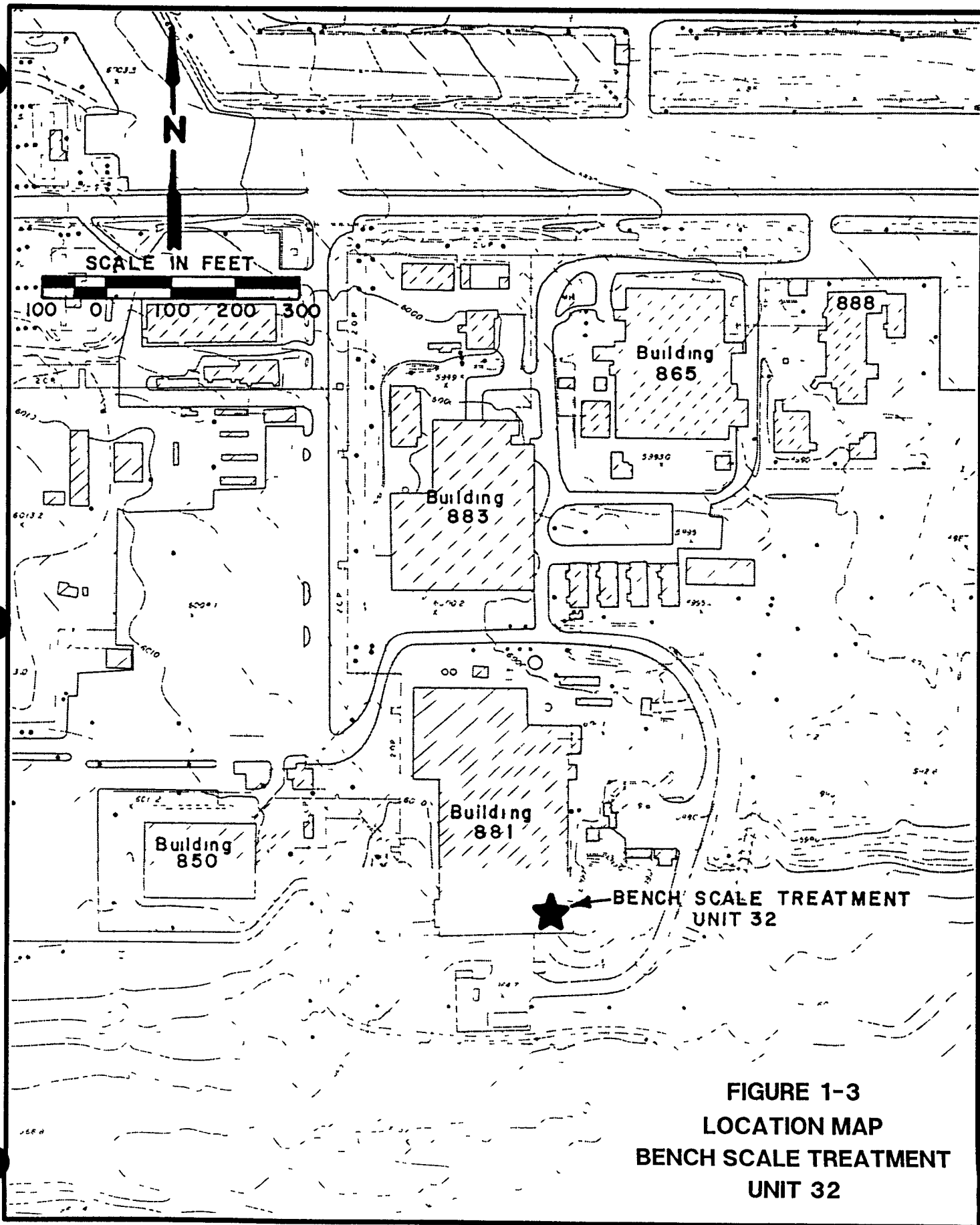


FIGURE 1-3
LOCATION MAP
BENCH SCALE TREATMENT
UNIT 32

1.2.5 Types of Wastes Stored and Treated in Unit

Aqueous cyanide solutions resulting from analyses of environmental samples (groundwater, surface water, etc.) are stored in the unit. Very low concentrations of other listed hazardous wastes may be in the solution. The average concentration of cyanide in the bottle is less than 20 ppm. The maximum concentration of cyanide ever added to the bottle is 100 ppm; however, this mixes with the other contents of the bottle to produce concentrations below 20 ppm.

1.2.6 Monitoring and Containment Systems

The wastes are contained in four-liter polyethylene bottles stored in a steel fume hood. The bottom of the fume hood acts as secondary containment. There is no automated monitoring system for detecting releases.

1.2.7 Releases

There have been no documented releases from the polyethylene bottles or spills during transfer or neutralization.

1.2.8 Disposal Lines

The neutralized solution is dumped into a drain for pipeline transport to Building 374 for further treatment. The cyanate resulting from the neutralization process is not a listed hazardous material. This drain is used for disposal of other wastes generated in the laboratory and will not undergo closure coincident with closure of the bench scale treatment unit. Closure of this drain will take place when all RCRA regulated wastes cease to be placed in the drain.

1.2.9 Geologic Setting

Building 881 is underlain by Rocky Flats Alluvium and colluvium derived from the alluvium. Excavation for building construction would have removed all or part of these materials. The Rocky Flats Alluvium consists of clay, silt, sand, gravel and cobbles deposited by alluvial fans. Since the alluvium was deposited on an erosional surface, the thickness is variable, but is generally less than 20 feet.

Underlying the alluvium and colluvium is the Arapahoe Formation. This formation consists of fluvial claystones with some inter-bedded sandstones and siltstones.

The groundwater in the Rocky Flats Alluvium is unconfined with flow controlled by the topography and bedrock surface. In the vicinity of Building 881, groundwater is about 2 to 9 feet below the surface. Groundwater in the Arapahoe Formation is found in the sandstone units.

Since the bench scale treatment unit has primary and secondary containment, and no spills have occurred, the unit is not believed to have affected the soil and groundwater.

1.3 MAXIMUM WASTE INVENTORY

No more than five liters of the cyanide waste have been stored at the laboratory at any time. During the 24 hours that it takes to neutralize the four liters of cyanide solution, some additional cyanide solution may be accumulated in a second four-liter bottle. An estimated 20 to 30 gallons of cleaning water will require treatment or disposal after decontamination of the unit.

1.4 DESCRIPTION OF AUXILIARY EQUIPMENT

The auxiliary equipment associated with the bench scale treatment unit includes the waste drain, pipeline to Building 374, and treatment facilities in Building 374. This equipment will remain in use after closure of the bench scale treatment unit due to the continued use of this auxiliary equipment for RCRA regulated activities. When all of these activities cease, this equipment will go through RCRA closure.

1.5 INTERIM STATUS CLOSURE PLAN SUMMARY

1.5.1 Interim Status Closure Objectives

This interim status closure plan has been prepared to meet the performance standards of 6 CCR 1007-3, Section 265.111. The promulgated standards require a facility must be closed in a manner that:

- o minimizes the need for further maintenance, and
- o controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous waste constituents, leachate, contaminated rainfall, or waste decomposition products to the groundwater, surface water, or to the atmosphere.

1.5.2 Closure Plan

It is expected that all of the equipment associated with the bench scale treatment unit can be decontaminated and reused or disposed of as a nonhazardous waste. All of the remaining waste

will be neutralized and transported to Building 374 for further treatment. No impacts on groundwater quality are expected to occur.

If decontamination of the bench scale treatment equipment is ineffective, a revised closure plan will be prepared and submitted to the Colorado Department of Health (CDH), within 30 days of making that determination, for approval. The effectiveness of decontamination will be evaluated by sampling and analyzing the final rinse water.

1.5.3 Closure Schedule

Closure of the unit will be initiated directly after approval of the closure plan is obtained. Closure of the unit will be completed within 90 days of the receipt of the last volume of waste, as shown in Figure 1.4. The waste inventory will be neutralized as detailed in Section 2, and the equipment used in the bench scale treatment unit will be decontaminated or disposed of in a safe and proper manner, as necessary.

The cleanup, decontamination and testing will be done by two qualified laboratory technicians and/or analytical chemists. One of the two will be the work-area supervisor. Health and safety and upper level management personnel will also be involved in the closure activities as warranted.

1.6 ADMINISTRATION OF INTERIM STATUS CLOSURE PLAN

The interim status closure plan for the bench scale treatment unit will be maintained at the Rocky Flats Area Office, Building

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111, U.S. Department of Energy. The person responsible for storing and updating this copy of the closure plan is:

Mr. Albert E. Whiteman
Area Manager

Mr. Whiteman's address and phone number are:

U.S. Department of Energy
Rocky Flats Plant
P.O. Box 928
Golden, Colorado 80402
Phone: (303) 966-2025

1.7 CLOSURE COST ESTIMATES AND FINANCIAL ASSURANCE

State and federal governments are exempt from the financial requirements imposed by Subpart H of 6 CCR 1007-3, Section 264.140 (c). Because the Rocky Flats Plant is a federally-owned facility, no cost estimates or financial assurance documentation are required. However, cost estimates are presented for planning, budgeting and informational purposes in Table 1-1. This estimate can in no way be considered binding.

The estimates presented on Table 1-1 are based on a worst case scenario in which the entire unit undergoing closure is found to be contaminated and all materials must be disposed of to insure all contamination is removed. These assumptions are expected to result in an overestimation of the actual costs that will be incurred since this is expected to require disposal of only those items listed in Section 1.5.3 and washing and rinsing of all other materials.

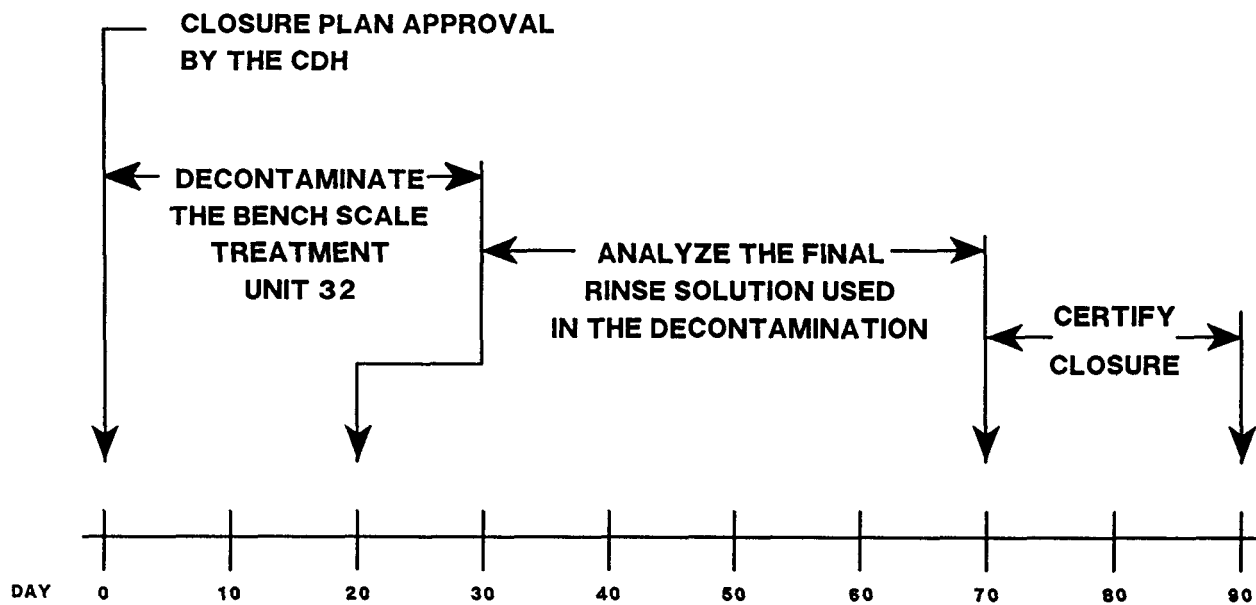


FIGURE 1-4
SCHEDULE OF CLOSURE ACTIVITIES
FOR THE
BENCH SCALE
TREATMENT UNIT 32



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TABLE 1-1
COST ESTIMATES FOR THE
BENCH SCALE TREATMENT UNIT 32

Engineering Design and Inspection	\$4,500
Equipment	1,000
Removal	500
Decontamination and Monitoring	900
Disposal	500
Contingency	<u>1,480</u>
Subtotal	\$8,880
Total of Bench Scale Treatment Unit 32	
Decontamination/Removal and Disposal	\$8,880

2 0

**REMOVAL, TREATMENT AND DISPOSAL OF WASTE FROM THE
BENCH SCALE TREATMENT UNIT**

2.0 REMOVAL, TREATMENT AND DISPOSAL OF WASTE FROM BENCH SCALE TREATMENT UNIT

2.1 INTRODUCTION

This section of the interim status closure plan responds to 6 CCR 1007-3, Section 265.112(a)(2) through (4) by providing the following information:

- o Estimates of the maximum inventory of wastes expected during the closure period.
- o Discussion of the volumes, removal methods, treatment procedures and disposal plans for any wastes or residues encountered.
- o Schedule for closure activities.

This closure plan is based upon the assumption that the Plant waste treatment capabilities will be available to treat the final waste inventory.

2.2 MAXIMUM AMOUNT OF REMAINING WASTE

The maximum amount of waste remaining at the time of closure will be 4 liters.

2.3 PROCEDURES FOR HANDLING REMAINING WASTE

The following subsections discuss the procedures for handling wastes remaining at the time of closure.

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2.4 SCHEDULE FOR RESIDUAL WASTE REMOVAL, TREATMENT AND
DISPOSAL

Within 90 days of receipt of the last volume of waste, the waste inventory will be neutralized and disposed of.

3.0

DECONTAMINATION OF THE BENCH SCALE TREATMENT UNIT

3.0 DECONTAMINATION OF THE BENCH SCALE TREATMENT UNIT

3.1 INTRODUCTION

The procedures specified in this interim status closure plan are based on the assumption that the equipment used in the treatment unit can be decontaminated. If decontamination is not possible, the equipment will be disposed of in compliance with RCRA regulations, DOE Orders, and standard facility operating procedures in effect at the time of disposal.

3.2 DECONTAMINATION AND REMOVAL OF THE TREATMENT UNIT

It is anticipated that the decontamination of the Bench Scale Treatment Unit will be accomplished by the waterwash method as opposed to the hydroblasting method of decontamination.

In hydroblasting, a high pressure (500 to 50,000 PSI) water jet is used to apply cleaning solutions to steel and concrete surfaces. Cleaning solutions may consist of cold or hot water with detergents, solvents, or abrasives. The combination of chemical and mechanical agitation is effective in removing contaminated debris from surfaces. The waste must be collected and promptly handled.

The time required for cleaning is directly proportional to the surface area to be treated. A rate of 40 square feet per hour is typical of average conditions. The amount of solution is approximately 1 gallon per square foot of surface.

Waterwashing is similar to hydroblasting, except that high pressure jets are not used. Foaming agents can be added to the water to facilitate decontamination with a minimum of wash water

generated. The amount of solution used is estimated to be about the same as in hydroblasting.

3.2.1 Unit Decontamination Procedures

After the final waste inventory has been treated and disposed, the four-liter container, the beaker, pH/ion meter and the interior of the fume hood will be cleaned with a cleaning solution prepared as follows:

To five gallons of potable water, add four pounds of calcium hypochlorite and one-fourth pound of sodium hydroxide. Stir with wooden or plastic stirrer until evenly mixed.

The equipment will be triple rinsed with potable water following waterwash cleaning with the solution described above. The rinsate from each rinse cycle will be kept separate for analysis and determination of disposal requirements for the rinsate.

Verification of decontamination will be accomplished by comparing the concentration of cyanide in the rinsate with background concentrations in the rinsate source. Testing will be conducted using EPA-approved procedures and minimum detection levels. In this test, concentrations of cyanide are measured in the rinsate source and in the rinsate after or during decontamination. The item is judged clean according to this test when the concentration of cyanide in the decontamination rinsate is smaller than the average concentration plus three standard deviations in the rinsate source.

When background values for cyanide in a rinsate source are less than the detection limit, then used rinse water must be at or below the detection limit for cyanide. In instances in which

some samples of the rinsate source are below the detection limit with other samples above the detection limit, then a value of one-half the detection limit will be used for all analyses less than the detection limit. These rinsate source values will be used in the statistics to develop the mean plus three standard deviations which must be met by the used rinse water. When only one sample of the rinsate source has been collected, then the used rinse water sample must be less than or equal to the rinsate source concentration.

One grab sample of the decontamination rinsate source will be taken immediately after its preparation. One grab sample of the used wash and rinse water will be collected from each rinse solution. Decontamination will cease when the contaminate level in the rinse water is below background.

It is estimated that 15 gallons of cleaning effluent from this procedure will be drained into the process waste system for treatment in Building 374 after it is determined that the equipment has been decontaminated.

3.2.3 Unit Packaging and Disposal

The following packaging and disposal procedures will be followed for the fume hood, beaker, polyethylene container, and chlorine-specific ion electrode only if decontamination procedures prove to be ineffective.

The fume hood and exhaust system will be broken down by mechanical means as necessary for packaging. Following size reduction, the fume hood and exhaust system, and the polyethylene container, beaker and electrode will be packaged in boxes made of plastic lined, triple-wall fiberboard with capacities of approximately 15

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cubic feet. The boxes will be disposed of at an approved facility. Manifests and records will be maintained by the U.S. DOE.

3.2.4 Health and Safety

Health and safety procedures used during decontamination will be identical to the procedures followed during current analyses at the unit. The decontamination personnel will wear cotton coveralls and surgical gloves during the procedure. Two people will be present at all times during decontamination.

4.0
CLOSURE CERTIFICATION

4.0 CLOSURE CERTIFICATION

4.1 CERTIFICATION REQUIREMENTS

Closure certification requirements are outlined in 6 CCR 1007-3, Section 265.115 and 40 CFR 265.115:

When closure is completed, the owner or operator must submit to the (Department of Health/Regional Administrator) certification both by the owner or operator and by an independent registered professional engineer that the facility has been closed in accordance with the specifications in the approved closure plan.

Certification by a registered professional engineer does not guarantee the adequacy of the closure procedures and does not necessarily involve detailed testing and analyses. It implies that, based on periodic facility inspections, closure has been completed in accordance with the specifications in the approved closure plan (U.S. EPA, 1981).

4.2 ACTIVITIES REQUIRING INSPECTIONS BY A REGISTERED PROFESSIONAL ENGINEER

An independent registered professional engineer will inspect the Bench Scale Treatment Unit 32 Area decontamination activities for certification of closure. The engineer will review the analytical results from the background and rinsate samples to determine when decontamination is complete. The engineer will review rinse water handling procedures to ensure that it is properly contained and disposed.

**4.3 ANTICIPATED SCHEDULE OF INSPECTIONS BY A REGISTERED
PROFESSIONAL ENGINEER**

An independent registered engineer will inspect the decontamination process in order that a final certification of closure can be developed which states that the closure has been carried out according to the plan. The engineer will periodically obtain and review the results of chemical testing which provide a record of the progress and effectiveness of the implemented closure plan.

The independent engineer and the owner will, at the end of closure, inspect the site and certify that the closure plan was carried out as described. Prior to final certification, deficiencies noted by the engineer will be corrected. When deficiencies have been corrected, the engineer will issue a written report to the regulatory agencies certifying that the facility has been closed according to this closure.

5.0
SITE SECURITY

5.0 SITE SECURITY

The existing security measures at the Rocky Flats Plant include:

- o a three-strand barbed wire cattle fence surrounding the facility posted to identify the land as a government reservation/restricted area,
- o a fence and armed guards posted 24 hours per day at two gates to the controlled area of the facility, and
- o surveillance by security cameras 24 hours per day.

The existing security measures are sufficient to meet the requirements of 6 CCR 1007.3, Section 265.14.

The existing fences and gates are operated and maintained by the U.S. DOE. Maintenance requirements will be performed by the U.S. DOE, regardless of closure activities at the bench scale treatment unit.